AMP2-DA

2U Analog/Digital Stereo Monitor

with Two Selectable AES/EBU Inputs (on BNC or XLR), Stereo Analog Inputs on XLR, Analog Outputs (of Digital Source) on XLR, Two 53-Segment Level Meters, and Phase Indication

Document P/N 821505 Rev. B

User Manual

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Important Safety Instructions

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat source such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10) Protect the power cord from being walked on or pinched, particularly at plugs convenience receptacles and the point where they exit from the apparatus.
11) Only use attachments/accessories specified by the manufacturer.
12) Use only with the cart stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13) Unplug this apparatus during lightning storms or when unused for long periods of time.
14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15) Do not expose this apparatus to rain or moisture.
16) The apparatus shall be connected to a mains socket outlet with a protective earthing connection.

CAUTION!

In products featuring an audio amplifier and speakers, the surface at the side of the unit, where the audio amplifier heat sink is internally attached, may get very hot after extended operation. When operating the unit excercise caution when touching this surface and ensure that external materials which may be adversely affected by heat are not in contact with it. There is a Hot Surface label (see diagram) attached to the aforementioned surface of the product.

Introduction

Congratulations on your selection of a Wohler Technologies product. We are confident it represents the best performance and value available, and we guarantee your satisfaction with it.

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Section 1

General Features and Specifications

Description

Features

Applications

General Specifications

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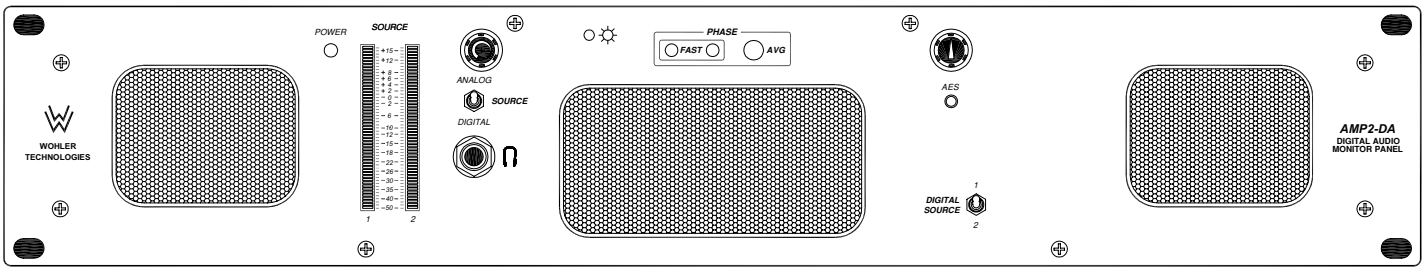
AMP2-DA

Powered Digital/Analog Audio Monitor Unit



AMP2-DA Front Panel

Description

The AMP2-DA is a complete, exceptionally high quality AES/Analog stereo audio monitoring system in a compact, two rackspace cabinet. It contains three audiophile-quality drivers and three power amplifiers; two amplifiers (and two speakers) that reproduce midrange and high frequency information in stereo, and a third amp/driver combination (and speaker) that handles summed Low Frequency (LF) information below the 500 Hz crossover point. The AMP2 series unique audio design has two important advantages. First, it provides optimally focused sound in an Ultra Near Field ™ (1 to 3 feet) environment. This allows higher SPL for the operator while reducing overall ambient sound and adjacent bay crosstalk. Second, electronic rather than acoustic cancellation of bass frequencies provides positive audible detection of reversed polarity ("out of phase") audio feeds. A unique LED display also visually shows all signals present and their "phase" (polarity) relationships.

AES/EBU or analog inputs may be selected for monitoring via a front panel toggle switch. The user may also select one of two AES/EBU inputs on the rear panel with a front panel toggle switch. The standard AMP2-DA model features two AES/EBU inputs on unbalanced 75 Ω BNC conectors while the special order option AMP2-DA/X model features these inputs on two balanced 110 Ω XLR connectors. Additionally there are two analog inputs and two analog outputs (from the selected digital source) on balanced 110 Ω XLR connectors.

Two wide-range, 53-segment high-resolution LED bargraph level meters are provided for the left and right channels (of the selected source) for accurate metering. The standard display mode is set as a single segment PPM "dot" above a VU bar; each segment's color being fixed according to its position on the scale. Other display modes are selectable via a DIP switch, which is accessible through holes in the top cover. Level meter gain is also configurable via this same DIP switch.

Features

- 2U high: highest fidelity in minimum rackspace
- Two AES/EBU inputs on BNC connectors
- AES/EBU 1 and 2 input source select via front panel toggle switch
- AES signal/error indication LED on front panel
- Analog stereo inputs on XLR connectors
- Analog outputs of the digital source on XLR connectors
- Analog/Digital source select via front panel toggle switch
- Two 53-segment tri-color LED bargraph meters
- User selectable meter Display Mode and Gain
- Phase (polarity) indication for left and right channels
- Headphone output

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Applications

The AMP2-DA is ideally suited for use in VTR bays, mobile production vehicles, teleconferencing installations, multimedia systems, satellite links and cable TV facilities, and on-air radio studios. Designed and manufactured in the U.S., the AMP2-DA is backed by a strong warranty and a satisfaction guaranteed return policy.

General Specifications

Input Connectors:	AES: BNC (x2), Analog: XLR (x2)
Peak Acoustic Output (@ 2 ft.):	104 dB SPL
Power output, RMS Each Side (4Ω): RMS Bass (4Ω):	14 W transient / 10 W continuous 35 W transient / 25 W continuous
Frequency Response, Sixth Octave:	80 Hz - 16 kHz ± 5 dB) (-10 dB @ 40 Hz, 20 kHZ)
Input Level for Maximum Output (Volume Full On):	0 dBv balanced / -10 dB unbalanced
Analog Input impedance:	40K Ω, balanced / 10K Ω, unbalanced
Hum and Noise (analog):	Better than -68 dB below full output
Distortion, Electrical:	Less than 0.15% at any level below input threshold
Distortion, Acoustic:	6% or less at worst case frequencies above 120 Hz, including cabinet resonance; typically less than 1.5%
Input Overload:	+26 dBv balanced
Converted analog out S/N:	>90 dB
Converted analog out THD:	<0.008%
Magnetic shielding:	<0.8 Gauss any adjacent surface
Power consumption (Average Maximum):	45 W
AC Mains input:	100-240VAC, 50-60 Hz Universal

Digital Input Specifications

AES termination:	75Ω (ohm) removable, unbalanced
AES sampling rate:	32-48 kHz, auto-select
D to A converter:	18-bit low jitter
D to A gain calibration, (dBFS = dB):	DIP switch selectable; -18=0, -9=+6, -20=+4, -20=+8

Level Meter Specifications

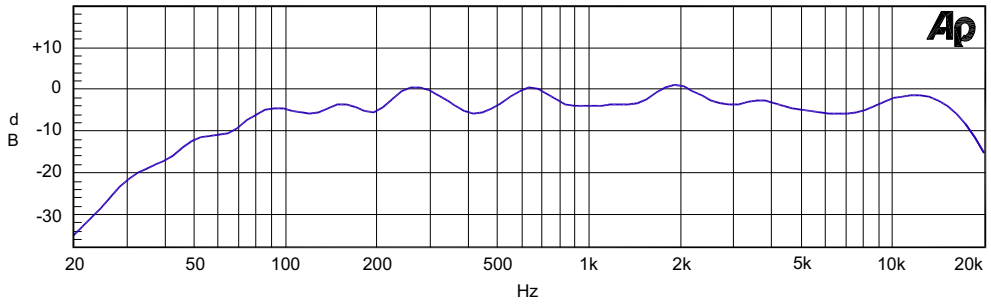
Level meter type:	53-Segment LED bargraph
Meter dynamics:	VU (bar) and/or PPM (dot), select
Dynamics modes:	PPM: 20 dB decay in 1.5 sec. or 3 sec hold VU: 3 sec. hold or 10 sec. hold
Level gain:	0, +4, +6, +8 dBu, select
Dynamic range:	65 dB
Midscale resolution:	1 dB
Segment colors:	Tricolor (green, amber, red)
Scale:	+16 to -50 dB
Segment size:	.158" x .04" (4.0132 x 1.016 mm)

Physical Specifications

Weight:	18 lbs. (8.2 kg)
Dimensions (HxWxD):	3.5 x 19 x 12 inches (89 x 483 x 305 mm)

On special order, custom combinations of connectors, controls and level meters are available.

Audio Response Curve



Typical 1/6 Octave Audio Response Curve

Units are designed to meet, at time of manufacture, all currently applicable product safety and EMC requirements, such as those of UL and CE. 0 dbV ref. 0.775V RMS. Features and specifications subject to improvement without notice.

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Section 2

Operation

Installation

Front Panel Features

Rear Panel Features

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Installation

Mounting

NOTE: Be sure to set the level meter Gain Calibration and Display Mode DIP switch (accessed through the top cover) and Input Termination and Input Gain Calibration DIP switches (accessed through the rear panel), BEFORE installing the unit into an enclosed rack or console. See pages 14 and 22 for setting information.

The unit should be mounted where convenient for operating persons, ideally at approximately ear level for best high frequency response. Its superior magnetic shielding eliminates concerns about locating it adjacent to most types of CRT monitors, including even high-resolution color monitors.

Heat Dissipation

Heat dissipated by the speaker amps is conducted directly to the left side of the chassis; no special considerations for cooling are necessary as long as the ambient temperature inside the rack area does not exceed approximately 40°C (104°F).

Sympathetic Vibration

Sympathetic vibration from other equipment (cables, etc.,) in the rack may be serious enough to interfere with the unit's sound quality out in the listening area. The use of thin card stock and/or felt or foam weather-stripping type materials between adjacent vibrating surfaces, or tying up loose cables, etc., may be required to stop vibrations external to the unit.

Mechanical Bracing

Even though the unit is fairly heavy, the chassis is securely attached to the front panel at eight points along its surface, not just at the four corners of the chassis ears. This feature will reduce or eliminate rear bracing requirements in many mobile/portable applications. The weight of internal components is distributed fairly evenly around the unit.

Audio Connections

Connection of the audio feeds is straightforward. Please refer to the system interconnect block diagram on page 24 for clarification of the general signal paths into and out of the AMP2-DA unit.

AES/EBU inputs are via either BNC (standard) or XLR (special order option) connectors. BNC inputs are 75Ω unbalanced; XLRs are 110Ω balanced. Care should be exercised to avoid mis-matched cable types and other similar causes of undesired reflections in RF signal systems. If severe enough, such reflections can result in corruption of the digital datastream.

Electrical Interference

As with any audio equipment, maximum immunity from electrical interference requires the use of shielded cable; however, satisfactory results can sometimes be obtained without it. The internal circuitry common is connected to the chassis.

AC Power

The unit's AC mains connection is via a standard IEC inlet, with safety ground connected directly to the unit's chassis. The universal AC input (100-240VAC, 50/60Hz) switching power supply is a self-resetting sealed type, with automatic over-voltage and over-current shutdown. There is no user-replaceable fuse in either the primary or secondary circuit.

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Front Panel Features

Please refer to Figure-2a on the following page to familiarize yourself with the front panel features of the AMP2-DA unit. The following sections describe these functions and are referenced, by number, to Figure-2a.

1 Speakers

The AMP2-DA internal speaker system is comprised of two mid-range tweeter speakers (left and right) and one woofer speaker (middle). The two side channel speakers reproduce, in stereo, only the mid and high frequencies. Please note that the woofer speaker (middle) is not a dedicated Center nor LFE speaker.

2 Power Indication LED

This LED glows green to indicate the AMP2-DA is connected to mains power and an operation voltage is present.

3 Audio Level Meter Bargraph Displays

Audio levels for the selected source (left and right) are visually displayed via these two high-resolution, 53-segment, tri-color (red, amber, green) LED bargraph display level meters. Bargraph **1** monitors the left channel while bargraph **2** monitors the right channel. Dynamic range for these meters is 65 dB and they are able to display signal levels using either PPM or VU standards with a choice of ballistic behaviors. Alternate display modes are user selectable via two DIP switch modules accessible through the top cover of the AMP2-DA. See page 22 for a description of the Bargraph Display Mode and Meter Input Gain Calibration settings.

4 Volume Control Pot

This controls the loudness of the audio reproduced by the internal speakers or connected headphone. Clock-wise rotation of this control increases the loudness of the monitored audio.

5 Headphone Jack

Select the headphone audio sources as you would for the internal speakers. When you plug in headphones, the internal speakers will mute. This jack accepts a standard 1/4” phone type stereo plug.

6 Analog/Digital Source Select Switch

This two position toggle switch allows the operator to choose between two primary input sources; **ANALOG** or **DIGITAL**. When this toggle switch is set to **ANALOG**, the unit will monitor the analog signals from the **ANALOG IN** XLR connectors on the rear panel (Item F, page 16). When this toggle switch is set to **DIGITAL**, the unit will monitor the selected channel of the **AES/EBU IN** BNC connectors **(1** or **2)** on the rear panel (Item C, page 14).

7 Bargraph Brightness Adjust Pot

This control is recessed into the front panel and can be accessed using a small screwdriver. Turning it clockwise will increase the relative brightness of the bargraph display LED segments. Adjusting this one control will simultaneously affect the brighness of both bargraph displays on the front panel.

8 Phase Indication LEDs

These three LEDs offer instant verification of phase (polarity) conditions in the pair of channels selected for monitoring in the Left/Right channel speakers. There are three LEDs; the two smaller LEDs labeled **FAST** (left side of the **PHASE** section) show instantaneous phase relationships in the signal, while the larger LED, labeled "**AVG**" (right side of the **PHASE** section), will indicate the *average* phase condition. The small **FAST** LED on the left glows (or blinks) green when signals are *in-phase*. The small **FAST** LED on the right glows (or blinks) amber for *out-of-phase* signals. The larger **AVG** LED indicates the *average* phase condition by glowing green for *in-phase* conditions, or red for *out-of-phase* conditions. In general, it is sufficient to regard the **AVG** LED (average phase condition) as adequete for proper phase monitoring. While it is normal for stereo signals to contain some intermittant instanateous out-of-phase and in-phase conditions (small LEDs), a steady red glow of the larger LED almost always indicates an out-of-phase alarm condition.

9 Balance Control Pot

This pans the volume balance between the left and right speakers (or headphones).

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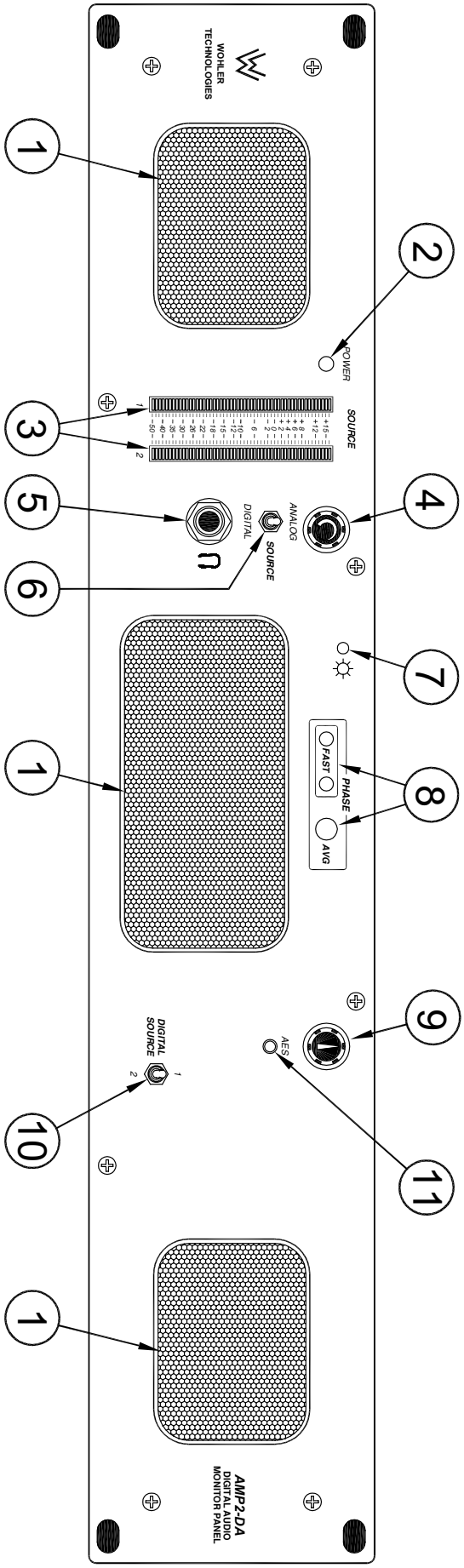

Figure-2a: Front Panel Features

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Front Panel Features

(Continued)

10 AES Source Select Switch

This two position toggle switch allows the operator to select either one of the two **AES/EBU IN** inputs **(IN 1** or **IN 2)** on the rear panel (Item C, page 14) as sources for monitoring. It should be noted that in order for the unit to monitor the selected AES source, the **ANALOG/DIGITAL Source Select Switch** (Item 6, page 10) must be set to **DIGITAL**.

11 AES Signal Error Indication LED

This bi-color (GREEN/RED) LED indicates the input status of the AES input signal selected by the **AES Source Select Switch** (**1** or **2**) (Item 10). This LED functions regardless of the position of the **ANALOG/DIGITAL Source Select Switch** (Item 6, page 10).

The LED glows GREEN as long as a valid AES/EBU digital datastream for the associated input channel is being received. The LED glows RED to indicate errors in reception *or* data errors (if the data has been tagged as inappropriate for conversion to analog by having the validity bit set).

An optional feature of the AES signal error detection is the ability to mute the audio when errors are detected in the AES signal. To enable this feature, a jumper is placed at H12 of the 919117 PCB. See page 30 for location of H12 on the 919117 PCB.

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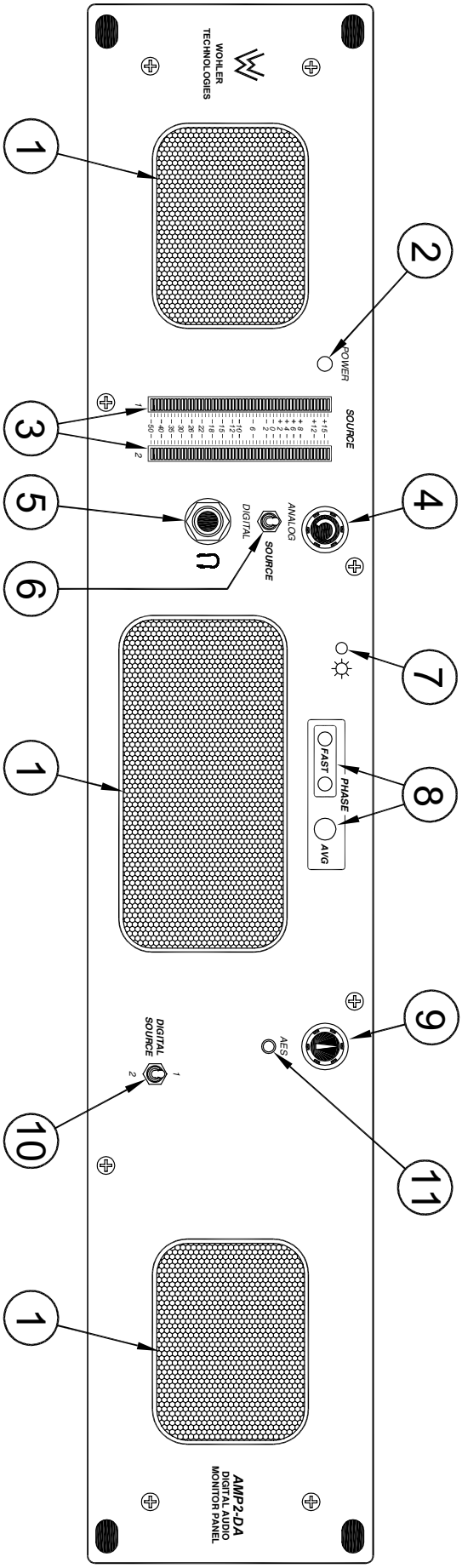

Figure-2b: Front Panel Features

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Rear Panel Features

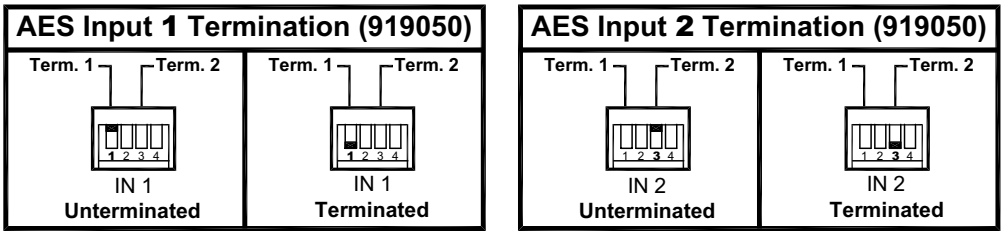
Please refer to Figure-2b on the following page to familiarize yourself with the rear panel features of the AMP2-DA unit. The following sections describe these features and are referenced, by letter, to Figure-2b.

A Power Connector

Attach a standard IEC-320 power cord between this connector and mains power (100 - 250VAC, 50/60 Hz). The front panel power LED (Item 2, page 10) will glow green to indicate operating voltages are present.

B AES Input Termination DIP Switch

This 4-position DIP switch is used to set the termination characteristics for the AES inputs. In the event that either of the two AES input channels is fed to downstream equipment (via the loop-throughs or "Y" or "T" connectors), then the associated DIP switch section **(S1=IN 1, S3=IN 2)** must be placed in the **Unterminated** (**UP**) position. If there is *no* downstream equipment connected, then the associated DIP switch section must be placed in the **Terminated** (**DOWN**) position. See below for a diagram of termination settings. **Note:** Sections **S2** and **S4** are not used.



Note: Positions S2 and S4 of DIP switch are not used.

C AES/EBU Input Connectors (Channels 1 and 2)

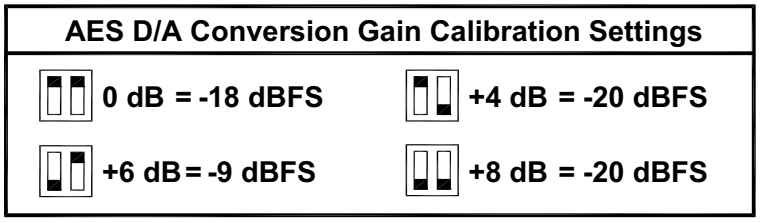
Only one of these two AES/EBU inputs may be monitored at a time. Selection between AES/EBU inputs **1** and **2** is accomplished using the **AES SOURCE Select Switch** on the front panel (Item 10, page 12). Note that the unit will monitor the selected AES/EBU channel only when the **ANALOG/DIGITAL Source Select Switch** on the front panel (Item 6, page 10) is set to **DIGITAL**.

AMP2-DA (Standard): Utilizes two unbalanced (75 Ω) female BNC connectors accepting standard AES/EBU signals.

AMP2-DA/X (Option): Utilizes two balanced (110 Ω) 3-Pin female XLR connectors accepting standard AES/EBU signals.

D AES Input Level Gain Calibration DIP Switch

Input Level Gain Calibration, the analog level which corresponds to a given digital input value, is settable via this DIP switch. The factory setting is +4 dB (analog) = -20 dBFS (digital). See the silk-screened chart on the rear panel or the diagram below for settings.



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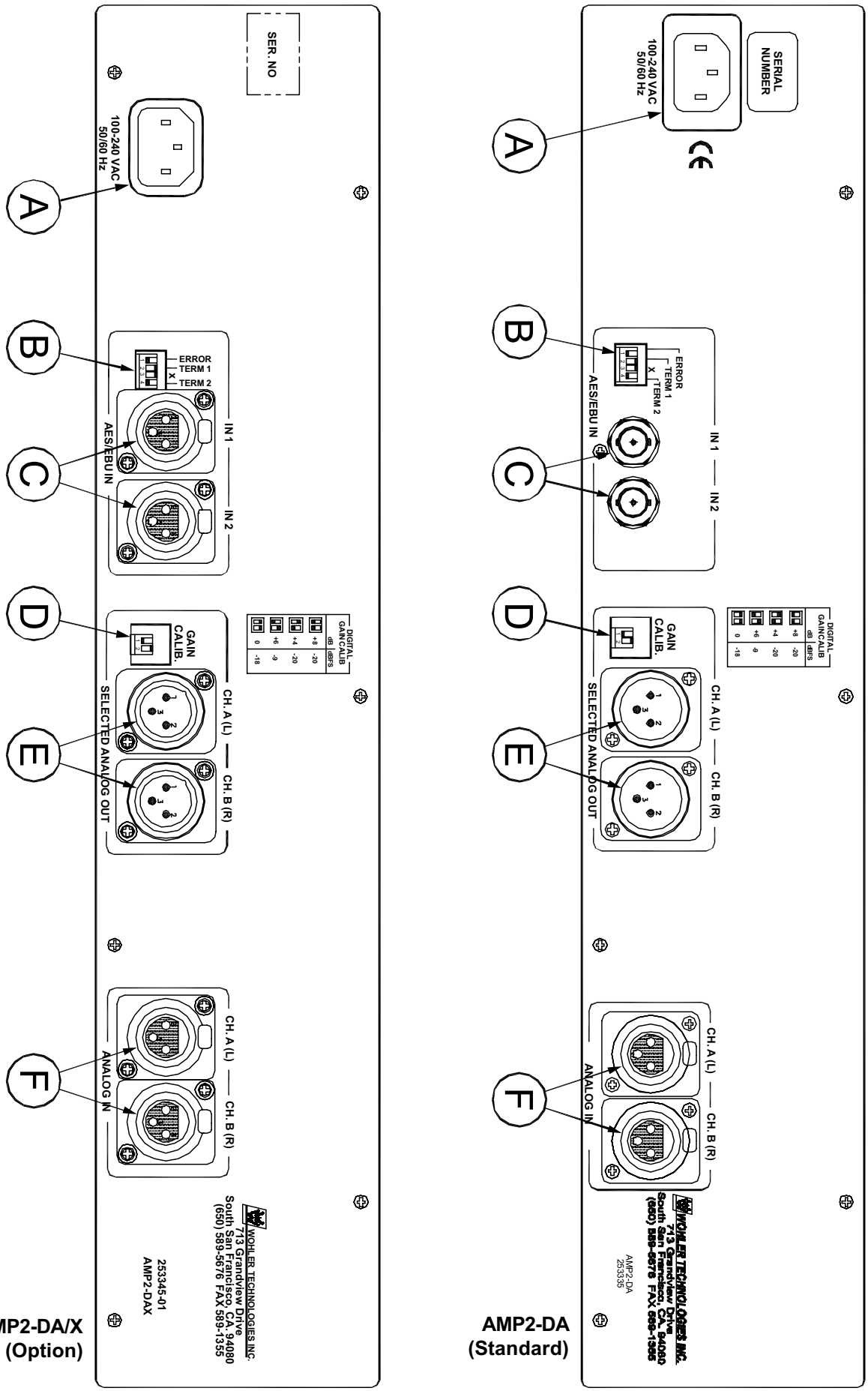

Figure-2b: Rear Panel Features

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Rear Panel Features

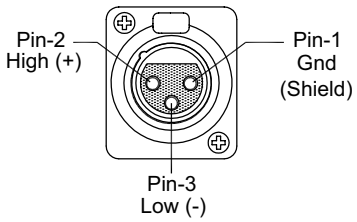
(Continued)

E Selected Analog Output Connectors

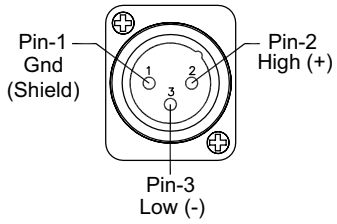
These two balanced (110 Ω) 3-pin male XLR connectors are analog outputs of the selected *digital* source as monitored by the left (Channel A) and right (Channel B) speakers and level meters. This output is not affected by the volume/balance controls or headphone mute. Pinout information for all XLR connectors is shown below in the diagram under Item F.

F Analog Input Connectors

These two balanced (110 Ω) 3-pin female XLR connectors accept standard analog audio signals. The unit will monitor signals input on these two connectors when the **ANALOG/DIGITAL Source Select Switch** on the front panel (Item 6, page 10) is set to **ANALOG.** Pinout information for all XLR connectors is shown in the diagram below.



Female XLR Pinout



Male XLR Pinout

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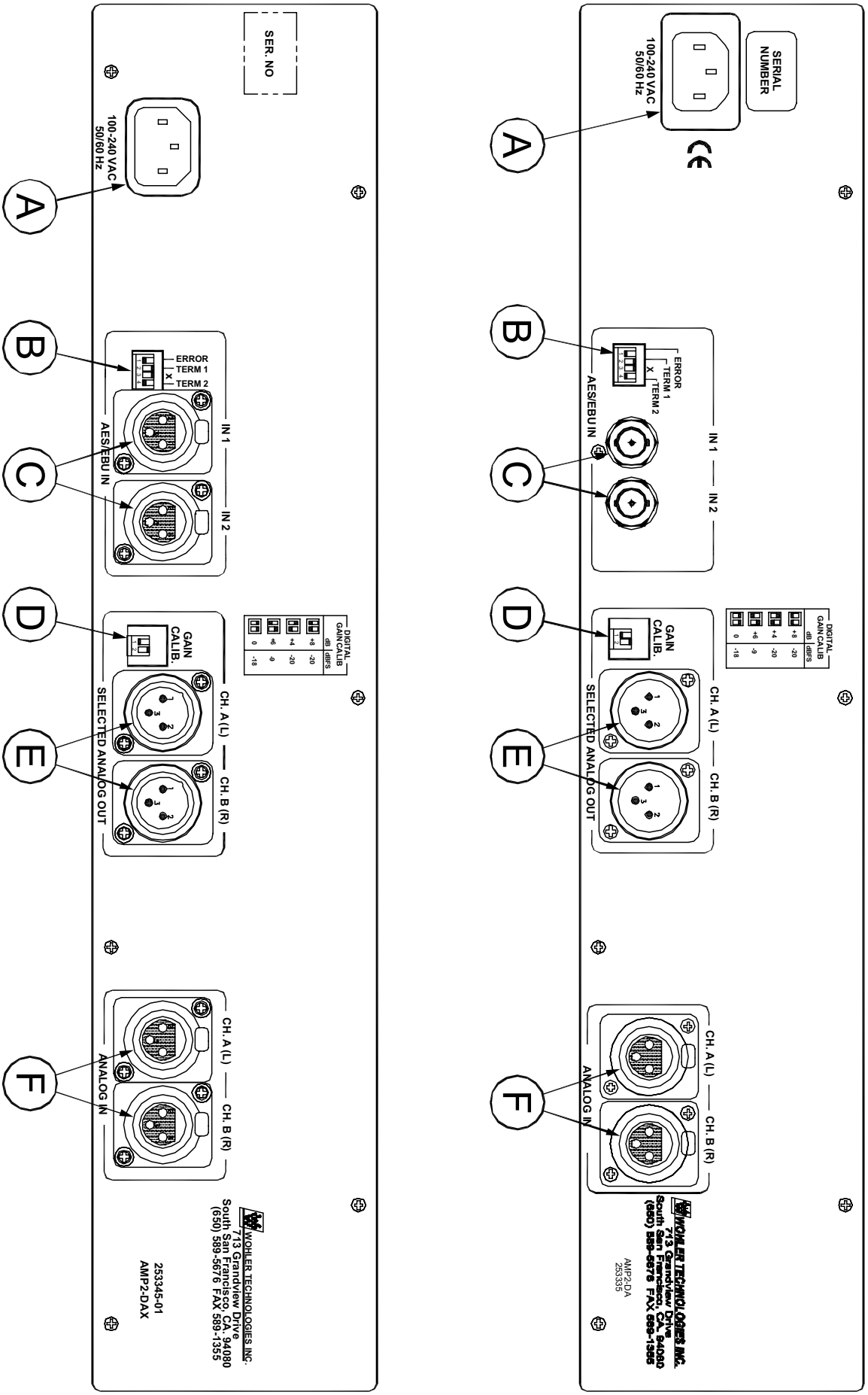

Figure-2b: Rear Panel Features

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Section 3

Technical Information

- General Technical Observations
- AES/EBU Input D/A Converter Module Circuit Description (919117)
- Level Meter, Scales, Circuit Descriptions, and Specifications
- Level Meter Gain Calibration and Display Mode Settings
- Level Meter Bargraph "0" (zero) Fine Adjustment
- AMP2-DA Interconnect Block Diagram

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General Technical Observations

General Mechanical Observations

Elimination of cabinet and component sympathetic vibrations (resonances) requires considerable attention to mechanical details. Because of this, and the physical constraints of the speaker's acoustic enclosures, even minor changes to any of the mechanical details of the unit can seriously impair its acoustic performance. This especially applies to the speaker baffles. If mechanical work on the unit is necessary, be sure to make adequate notes to permit accurate reassembly.

Unfortunately, the unusual and wholly proprietary method of magnetic shielding is usually degraded slightly by any disassembly of the unit, except removal of the rear panel. Almost any maintenance or repair will require removal of the cover. If an immediately adjacent video monitor shows magnetic interference after reassembly of the unit, it must be returned to the factory to restore the shielding completely.

General Audio Circuitry Observations

Since a single-sided power supply is used, all amplifier sections are "biased" with a 1/2 supply reference, so all opamp signal terminals on the main board should have a DC level of +12V, +/-0.7V. Signal inputs to the main audio board from any of the input select circuits are via the balanced input stage, in lieu of the XLR analog inputs on the basic unit. Signal feed points for level meters and the phase indicator are immediately after the input stage, and before the volume control section.

The signal pick-off for the headphones is after the volume and balance controls. Speaker muting is controlled by circuitry that senses connection of headphones to the jack.

The power amps are attached to an aluminum heatsink plate (which is also connected to the circuit common for these devices). The heatsink plate forms an operational module separate from the chassis, which allows access to the solder side of the circuit board while power is applied to the circuitry. To avoid thermal shutdown of the power amp(s), they should NOT be operated without their tabs being fastened to the heatsink plate.

Variations in the frequency response of different production runs of drivers has sometimes required minor adjustments in the equalization/crossover components in individual runs of units. Some of these components may have values slightly different than those indicated in the schematic, which are the nominal ones. If any of the drivers (speakers) are replaced, it may be helpful to change some of these components to achieve maximum flatness of response.

The operating threshold of the woofer limiter is critical to both satisfactory reproduction of musical transients and preventing damage to, or destruction of, the speaker itself. The side speaker output limiter circuits are similarly important, though not as critically adjusted.

The woofer power amps are arranged in a bridge configuration; care must be taken to avoid letting EITHER speaker terminal contact the chassis (common) OR THE GROUNDED LEAD OF ANY TEST EQUIPMENT so as not to short out the power amps. The side speaker outputs are single-ended, so these precautions are not necessary for them.

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AES/EBU Input D/A Converter Module PCB Circuit Description (919117)

There are four primary and three ancillary sections comprising the 719117 AES/EBU digital to analog converter:
1) Input source selection.
2) audio data extraction.
3) Digital to analog conversion.
4) Analog buffer / output amplifiers.
5) Power suppy, Reset, and Error indication.

Input Source Selection (IC13)

Each of the two selectable signal inputs are transformer-coupled to the inputs of a one-of-two active buffer/switch (IC13). The output of this switch is applied to the receiver stage of the AES receiver/unframer.

Audio Data Extraction (IC11)

"Header" and ancillary data are removed from the recovered input datastream, yielding a datastream having only alternating left/right channel audio data, which is output on pin 26 of IC11.

Digital to Analog Conversion (IC10)

The "pure" audio datastream, along with a data clock and a channel ID (left/right) clock, are applied to a 20 bit two channel D to A converter (IC10), where the datastream is converted into left and right analog outputs.

Analog buffer (IC4) / Output Amplifiers (IC8, IC9)

Buffer/amps provide balanced left and right channel outputs as well as single ended outputs. Gain calibration, the analog level, which corresponds to a given digital value, is settable via a DIP switch. The default factory setting is 20 dB below "full code" (digital zero) to equal +4 dbu (0.775V). The other three settings possible are for -18 dBfs = 0 dBu, -20 dBfs = 0 dBu, and -20 dBfs = +8 dBu. See page 16 for DIP switch location and settings.

Power Supply

The 24V rail internal to the rest of the unit is converted to +5V for digital portions of the 919117 PCB by switching regulator IC12.

Error Indication

The AES status LED is a bicolor LED (Red/Green). It is green as long as a valid digital data strean is being received. The 8412 receiver is capable of indicating two types of error conditions: 1) Faulty data; data identified by the sending device (possibly invalid), and 2) Faulty reception; errors in reception of data or no data stream at all.

Level Generator (919126) and LED Driver (919110) PCB Circuit Descriptions

Level Generator Boards (919126)

All signals are input to discrete level generator PC boards. Each level generator PC boards responsibility is to process tasks such as Digital Signal Processing (DSP), frequency response, integration time, and VU or PPM “dot” display mode. The ADSP-2115 chip on the each Level Generator board handles the entire processing function. During the assembly of an AMP2 Digital unit, software is programmed and loaded to a socket chip for a specific unit in-house.

A standard factory calibration of "0" indication when input level is +4 dBV is set for the calibration level unless specified differently by the end user. A bank of DIP switch sections is located at the rear of Level Generator boards, which can be accessed through the top cover. A combination of DIP switch settings can be used to apply display mode (VU, PPM) and level meter gain.

LED Driver Boards (919110)

All the digital information processed from the Level Generator PC boards are transfered to the LED driver boards through either a 10-pin color coded cable. LED Driver Boards accept fixed-length word serially, and latch the outputs for the bargraph segments corresponding to those bits in the received word, which are set high.

Brightness of the bargraph displays can be adjusted to a desired setting by adjusting the trimpot located on the front panel. All bargraph displays are simultaneously adjusted with this one trimpot.

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Level Meter Settings and Specifications

Level Meter DIP Switch Settings

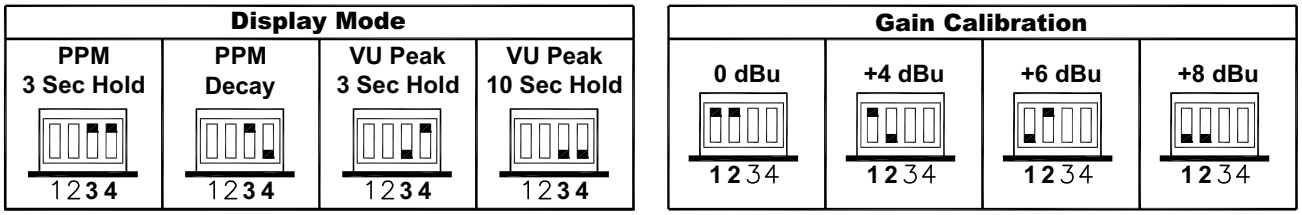
A DIP switch module, accessed through holes in the top cover, allows the user to set the Bargraph Display Mode and Meter Input Gain Calibration. There is one DIP switch module for each *pair* of meter bargraphs.There are four sections (1, 2, 3, 4) on each DIP switch module. The first two sections (1, 2) are for setting the Meter Input Gain Calibration and the second two sections (3, 4) are for setting the Bargraph Display Mode.

Meter Input Gain Calibration Settings:

DIP switch sections 1 and 2 set the Meter Input Gain Calibration, which determines the level of the input signal (after digital to analog conversion) that will result in a "0" reading on the meter bargraphs. The factory setting is +4 dBu, but can instead be set for 0 dBu, +6 dBu, or +8 dBu by the user. See the diagram below fior settings.

Bargraph Display Modes:

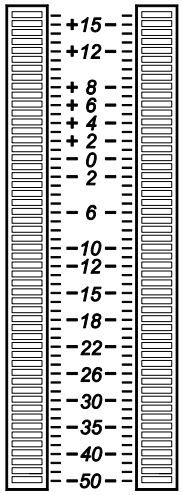
DIP switch sections 3 and 4 (S3 and S4) determine how peak levels are displayed (Display Mode). S3 selects either the "PPM" mode or an auto-reset "VU Peak" mode (NOT the PPM value!). If S3 is set for PPM mode, S4 determines whether it is displayed in the original "floating PPM dot" mode (no Hold, continuous decay of 20 dB in 1.5 seconds) or as a 3 second auto-reset Hold. When S3 is set for "VU Peak", S4 sets the Hold time to either 3 or 10 seconds. The factory setting is PPM Decay mode (no Hold, continuous decay of 20 dB in 1.5 seconds). See the diagram below for settings.



Installation Note: The Meter Input Gain Calibration/Bargraph Display Mode DIP module(s) is accessible through openings in the top cover of the unit. Any adjusments to DIP switch module(s) should be performed *before* installing the unit into an enclosed rack.

LED Bargraph Level Meter Specifications:

Level meter type:	LED bargraph
Segment quantity:	53
Meter display modes (DIP switch selectable):	VU (bar) or PPM (dot)
PPM characteristics (DIP switch selectable):	20 dB decay in 1.5 seconds or 3 second hold
VU characteristics (DIP switch selectable):	3 second hold or 10 second hold
Level gain (DIP switch selectable):	0, +4, +6, +8 dBu
Level meter scale:	+16 to -50 dB
Dynamic range:	65 dB
Midscale resolution:	1 dB
Bargraph Length:	2.22" (56.4 mm)
LED segment size:	0.14" x 0.028" (3.57 x 0.7 mm)
LED segment pitch:	0.041" (1.05 mm)
Segment display color:	Tri-color (red, amber, green)
Peak emmision wavelength:	Green: 570 nm, Red: 630 nm
Segment brighness, (If = 20 mA):	3.5 mcd
Segment brightness, uniformity:	<10% difference between segments
Adjacent segment "Off" brightness:	<1% of brightness of active segment



53-Segment Bargraph Scale

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Level Meter Bargraph "0" (zero) Fine Adjustment

Note: For range setting, use the Meter Input Gain Calibration/Bargraph Display Mode DIP Switches

1) Removal of the Top Cover

Remove the top cover screws (2 along upper front panel, 2 per each side, 3 along upper rear panel). The 919126 PCB is vertically mounted to chassis bottom just behind the front panel mounted LED driver PCB (see photo below).

2) Adjustment Pot Locations and Functions

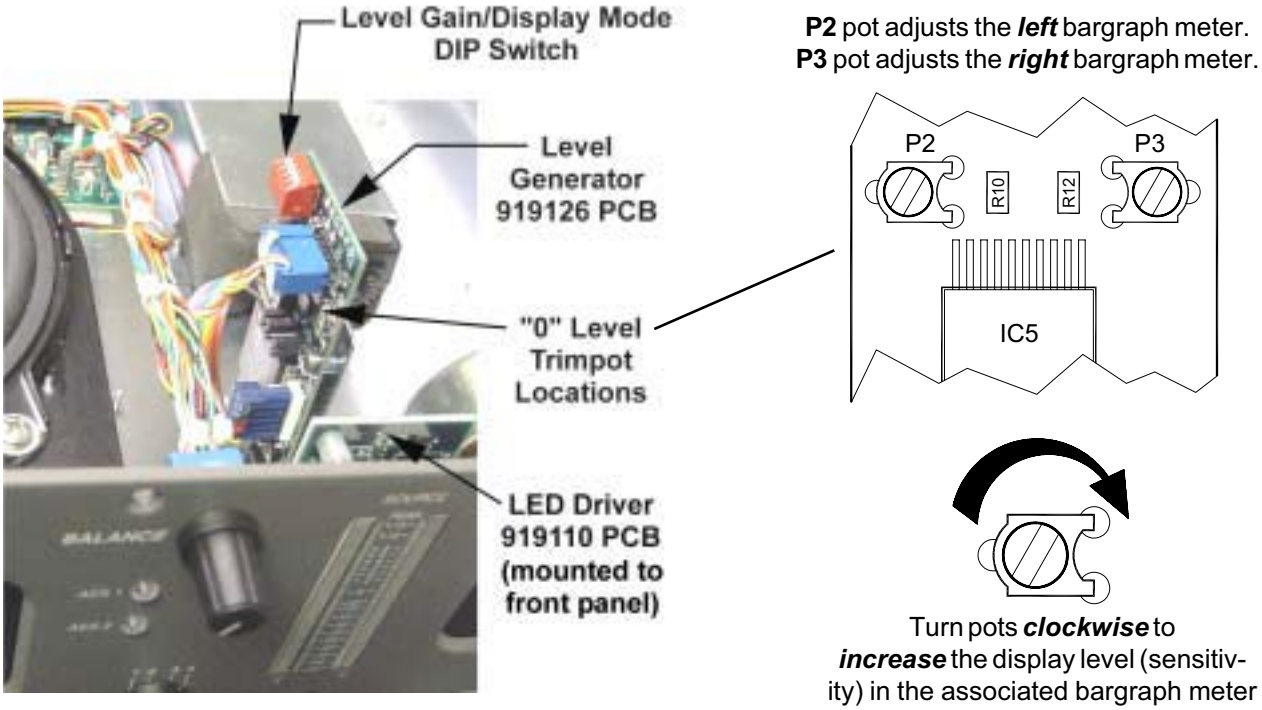
On the 919126 PCB(s) the P2 pot adjusts the *left* (Channel A) bargraph meter and the P3 pot adjusts the *right* (Channel B) bargraph meter. See diagrams below.

3) "0" Fine Adjustment Setup

Connect a test signal of approximately 1 kHz of the amplitude desired to give a "0" indication on the bargraph. This signal should be connected across the balanced inputs, and should be from a balanced source.

4) Fine Adjustment of the Bargraph "0" Level

Turning each pot clockwise *increases* the *displayed* level (sensitivity) of the associated bargraph meter. For example, to set the zero level at +7 dBu (rather than the factory default setting of +4 dBu), adjust the appropriate DIP switch for gain closest to that desired (see page 22 for Gain Calibration settings). Feed a +7 dBu signal (see step 3) into the analog input on the rear panel (Item F, page 16), then turn the pots *counter*-clockwise as you visually monitor the associated bargraph meter on the front panel until the desired display setting ("0") is achieved for the increased input level. To zero the meters for a lower input level, you would turn the pots *clockwise* to increase the displayed level for any decreased input level.


Level Gain/Display Mode DIP Switch
Level Generator 919126 PCB
"0" Level Trimpot Locations
LED Driver 919110 PCB (mounted to front panel)
P2 pot adjusts the left bargraph meter.
P3 pot adjusts the right bargraph meter.
P2
P3
R10
R12
IC5
Turn pots clockwise to increase the display level (sensitivity) in the associated bargraph meter

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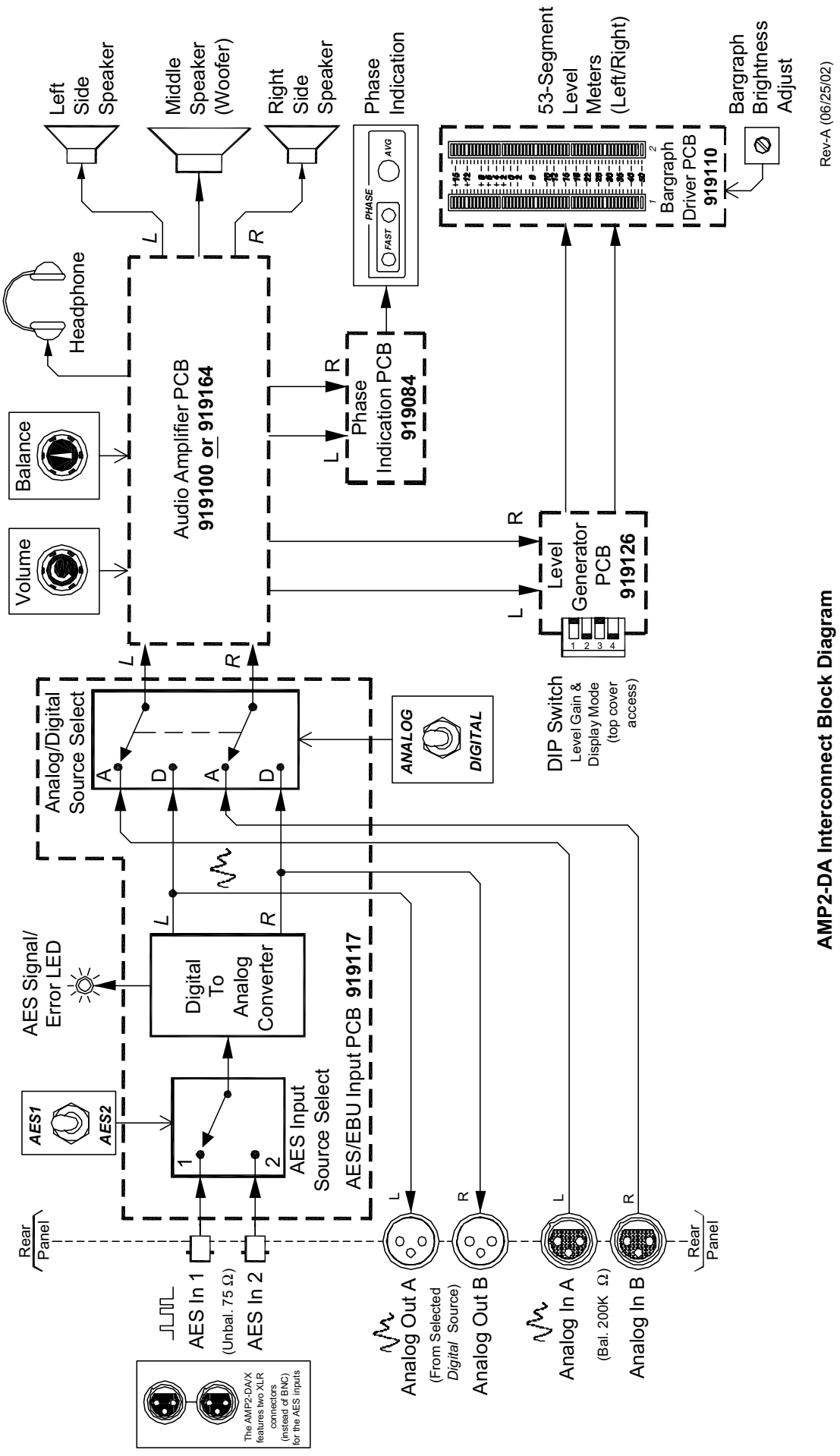
AMP2-DA Interconnect Block Diagram



AMP2-DA Interconnect Block Diagram

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